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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/594,839	06/15/2000	James Anthony	2629-4017	3097

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EXAMINER	
CHUNDURU, SURYAPRABHA	
ART UNIT	PAPER NUMBER
1637	

DATE MAILED: 05/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/594,839	ANTHONY ET AL.	
	Examiner	Art Unit	
	Suryaprabha Chunduru	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55* is/are pending in the application.

4a) Of the above claim(s) *47* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-46 and 48-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/13/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicants' response to the office action filed on March 17, 2006 has been entered.

Status of the Application

2. Claims 1-24, 26-36, 38-46, , 48-55 are pending. Claims 25 and 37 are cancelled. Claim 47 is withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group.. This action is made Non-Final.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 22-23, 24, 30-31, 33, 36 are rejected under 35 U.S.C. 102(b) as being anticipated by Chandler et al. (J Clin Microbiol., Vol. 31, No. 10, pp. 2641-2647, 1993).

Chandler et al. teach a method of claim 22-23 for detecting a target nucleic acid (single-stranded viral genome) comprising

(a) hybridizing a single-stranded target to a capture sequence probe (poly (dA)-tailed capture probe) and a signal sequence (labeled RNA probe) , wherein said hybridization forms a hybrid complex comprising DNA-RNA hybrids between said capture probe and a portion of the target nucleic acid and between said signal sequence and a portion of the target nucleic acid (see page 2642, col. 2, paragraph 3, page 2643, col. 1, paragraph 1);

(b) binding the hybrid complex to an antibody which recognizes the hybrid complex, wherein the antibody is detectably labeled (see page 26,43, col. 1, paragraph 1, col. 2, line 1-21);

(c) detecting the target nucleic acid (see page 2643, col. 2, line 1-21).

With regard to claim 30, 33, Chandler et al. teach forming single-stranded DNA prior to hybridization (see page 2642, col. 1, pargraph 2 under materials and methods section).

With regard to claim 31, the capture and signal probes are added sequentially (see page 2643, col. 1, paragraph 1).

With regard to claim 36, Chandler et al. teach that said antibody is labeled with alkaline phosphatase (see page 2643, col. 2, line 1-21). Accordingly Chandler anticipates the instant claims.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

A. Claims 1-21, 32, 38-46, 48-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Collins et al. (USPN. 5,750,338) in view of Murakami et al. (Nucleic Acids Res., Vol. 19, No. 15, pp. 4097-4102, 1991) and Shah et al. (USPN. 5,629,156).

Collins et al. teach a method of claim 1-2, 37-38, 40, 46, of detecting a target nucleic acid (includes single-stranded or double-stranded nucleic acid) comprising

(a) hybridizing a single-stranded target nucleic acid to an immobilized capture sequence probe and a signal probe to form a hybrid complex comprising double stranded hybrids between said immobilized capture sequence probe and a portion of the target nucleic acid, and between said signal sequence probe and a portion of the target nucleic acid, wherein the capture sequence probe and the signal sequence probe hybridize to non-overlapping regions within the target nucleic acid and do not hybridize to each other (for example, see col. 7, line 14-48, col. 13, line 4-23, indicating first capture sequence probe or first probe comprising a homopolymer sequence) and second signal sequence probe or second probe comprising a homoploymer sequence different from the first homopolymer sequence) probes hybridizing to non-overlapping regions of a target nucleic acid);

(b) adding blocker probe to the hybridization reaction , wherein said blocker probe hybridizes to excess non-hybridized capture sequence probe (for example, see col. 7, line 25-39, a background support comprising a homopolymer sequence hybridizes with unbound probe ligand comprising complementary hompolymer sequence, see also col. 13, line 24-55, col. 6, line 42-54);

(c) detecting immobilized double-stranded hybrid complex thereby detecting the target nucleic acid (see col. 7, line 30-39).

With regard to claims 2, 41, Collins teach that the capture sequence probe is immobilized to a solid matrix (col. 7, line 30-39, line 52-63, indicating that the first probe or probe series is associated with a capture support (s)).

With regard to claim 3, 43-44, Collins et al. teach that the capture sequence probe is modified with at least one ligand (see col. 7, line 30-33);

With regard to claim 1, 4, Collins et al. teach that the signal sequence probe is unlabelled (see col. 24, line 42-48, col. 22, line 10-19);

With regard to claim 5, Collins et al. teach that said ligand is biotin (see col. 15, line 1-12);

With regard to claims 7-8, Collins et al. teach that the capture sequence probe and signal sequence probe hybridize to regions of the target nucleic acid comprising less that 500 bases apart (see col. 19, line 32-38);

With regard to claim 9, Collins et al. teach that the capture sequences probe is a fusion of two or more sequences complementary to different target molecules (see col. 7, line 52-60);

With regard to claim 11, 30, Collins et al. teach that the method comprises forming single-stranded DNA prior to hybridization (see col. 29, line 1033, table 4, step 1, indicating denaturation step);

With regard to claim 10, 20, Collins et al. teach that the hybrid comprises DNA-RNA hybrid (see col. 30, line 10-14, indicating DNA probes directed to RNA target sequences which forms DNA-RNA hybrid);

With regard to claims 12-13, Collins et al. teach that the method steps are performed sequentially or simultaneously (see col. 7, line 14-54, col. 13, line 4-64);

With regard to claims 15-17, 32, Collins et al. teach that the hybrid is captured onto a solid phase which is coated with streptavidin (antiligand) (see col. 8, line 21-38, col. 25, line 62-66, see col. 29, table 4, step 9, col. 28, line 56-63);

With regard to claim 18, , Collins teach that the capture of hybrid complex is carried out at room temperature (see col. 28, line 9-17);

With regard to claim 39, Collins teach that the blocker probe has lower melting temperature than that of the capture sequence probe (see col. 26, line 3-15);

With regard to claim with regard to claims 19, 21, 42, Collins et al. teach that the double-stranded hybrid is detected using an antibody (streptavidin) labeled with alkaline phosphatase (see col. 29, table 4, step 9, col. 28, line 56-63);

However Collins et al. did not specifically teach blocker probes to capture unhybridized probes, two biotins attached to capture probes and bridge probes comprising poly (a) tail.

Murakami et al. teach a method for detection of hybrid formation in a solution, wherein Murakami et al. efficiently separating unbound probe from that of target bound probe wherein oligomeric protein probe is used to bind unbound probe (see page 4097, col. 1 paragraph 1 under introduction, col. 2, line 1-4, paragraph 1).

Shah et al. teach a method of detecting a target nucleic acid wherein Shah et al. disclose that the method comprises hybridizing a target nucleic acid (DNA or RNA) to a first capture probe and a second capture probe (signal sequence probe), and a third capture probe (bridge probe) detecting the bound hybrid (see column 7, lines 17-42). Shah et al. also teaches immobilization of capture probes on to solid support (see column 4, lines 29-32) and capture or release using first and second capture probes can be performed in either order (simultaneously or

sequentially) (see column 6, lines 58-65) and are biotinylated to facilitate binding to the streptavidin derivatized supports for stronger binding (see col. 8, line 25-36). Further Shah et al. teach use of dA-tailed probes comprising repeat units (bridge probes) which bind to both target and dT derivitized supports to form a stable target capture complex (see column 8, lines 44-54).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of detecting a target nucleic acid as taught by Collins et al. with the step of adding blocker probes, dA-tailed probes comprising repeat units and immobilization of capture probes as taught by Murakami et al. and Shah et al. to achieve expected benefit of developing an enhanced and improved method for detecting multiple nucleic acid targets of a sample because Murakami et al. explicitly taught the significance of separating unbound probes (see page 4097, col. 1, paragraph 1 under introduction and col. 2, line 1-4, paragraph 1) and Shah et al. explicitly taught that 'the new assay format eliminates noise due to nonspecific binding of the detector probe to the capture probe and can produce a sandwich hybridization assay entirely free of background noise (see col. 3, line 49-64). In order to reduce signal to noise ratio in hybridization assays involving DNA-RNA interaction, an ordinary practitioner would have been motivated to modify the method of detecting a target nucleic acid as taught by Collins et al. by incorporating blocker probes and dA-tailed bridge probes as taught by Murakami et al. Shah et al., to develop a method that would improve sensitivity and specificity of detecting a target nucleic acid which would result in reduced background signal noise and enhanced sensitivity and specificity of the detection of multiple targets in a biological sample. Further Shah et al. taught the use of two biotins attached to capture probes to increase the detection signal by increasing biotin-avidin binding and the modification of the method of

Collins et al. by incorporating two biotins to enhance the hybrid complex signals as taught by Shah et al. and reduce background unhybridized probes as taught by Murakami et al. and such modification is considered obvious over the cited prior art in the absence of secondary considerations.

B. Claims 26-29, 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chandler et al. (J Clin Microbiol., Vol. 31, No. 10, pp. 2641-2647, 1993) in view of . Shah et al. (USPN. 5,629,156).

Chandler et al. teach a method of claim 22-23 for detecting a target nucleic acid (single-stranded viral genome) comprising

(a) hybridizing a single-stranded target to a capture sequence probe (poly (dA)-tailed capture probe) and a signal sequence (labeled RNA probe) , wherein said hybridization forms a hybrid complex comprising DNA-RNA hybrids between said capture probe and a portion of the target nucleic acid and between said signal sequence and a portion of the target nucleic acid (see page 2642, col. 2, paragraph 3, page 2643, col. 1, paragraph 1);

(b) binding the hybrid complex to an antibody which recognizes the hybrid complex, wherein the antibody is detectably labeled (see page 26,43, col. 1, paragraph 1, col. 2, line 1-21);

(c) detecting the target nucleic acid (see page 2643, col. 2, line 1-21).

However Chandler et al. did not teach labeling capture probe with biotin, streptavidin coated solid phase..

Shah et al. teach a method of detecting a target nucleic acid wherein Shah et al. disclose that the method comprises hybridizing a target nucleic acid (DNA or RNA) to a first capture probe and a second capture probe (signal sequence probe), and a third capture probe (bridge

probe) detecting the bound hybrid (see column 7, lines 17-42). Shah et al. also teaches immobilization of capture probes on to solid support (see column 4, lines 29-32) and capture or release using first and second capture probes can be performed in either order (simultaneously or sequentially) (see column 6, lines 58-65) and are biotinylated to facilitate binding to the streptavidin derivatized supports for stronger binding (see col. 8, line 25-36). Further Shah et al. teach use of dA-tailed probes comprising repeat units (bridge probes) which bind to both target and dT derivitized supports to form a stable target capture complex (see column 8, lines 44-54).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of detecting a target nucleic acid as taught by Chandler et al. with the step of adding biotin-streptavidin ligand and immobilization of capture probes as taught by Shah et al. to achieve expected benefit of developing an enhanced and improved method for detecting multiple nucleic acid targets of a sample because Shah et al. explicitly taught that 'the new assay format eliminates noise due to nonspecific binding of the detector probe to the capture probe and can produce a sandwich hybridization assay entirely free of background noise (see col. 3, line 49-64). In order to reduce signal to noise ratio in hybridization assays involving DNA-RNA interaction, an ordinary practitioner would have been motivated to modify the method of detecting a target nucleic acid as taught by Chandler et al. by incorporating biotin-streptavidin ligands as taught by Shah et al., to develop a method that would improve sensitivity and specificity of detecting a target nucleic acid which would result in reduced background signal noise and enhanced sensitivity and specificity of the detection of multiple targets in a biological sample. Further Shah et al. taught the use of two biotins attached to capture probes to increase the detection signal by increasing biotin-avidin binding and the

modification of the method of Collins et al. by incorporating two biotins to enhance the hybrid complex signals as taught by Shah et al. and such modification is considered obvious over the cited prior art in the absence of secondary considerations.

5. The following is the rejection made in the previous office action:

Non-Statutory Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-24, 26-36, 38-46, 48-55 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-52, 54-92 of copending Application No. 10/311,645 (Pub. No. US 2004/0214302). An obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but an examined application claim not is patentably distinct from the reference claim(s) because the examined claim is either anticipated by, or would have been obvious over, the reference claim(s). See e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed.Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed.Cir. 1985). Although the conflicting claims are not identical, they are not patentably distinct from

each other because the claims 1-2, 22, 40, 50 are generic to all that is recited in claims 1-2, 25, 43, 56, 62, of the co-pending patent application. That is, the claims 1-2, 25, 43, 56, 62, of the co-pending application fall entirely within the scope of claims 1-2, 22, 40, 50 or in other words, claims 1-2, 22, 40 50 are anticipated by the claims 1-2, 25, 43, 56, 62, of the co-pending application. Specifically the method of steps of the claims 1-2, 25, 43, 56, 62 of the co-pending application are within the scope of the instant claims 1-2, 22, 40 50. Further, claims 3-21, 23-24, 26-36, 38-39, 41-46, 48-49, 51-55 are generic to all that is recited in claims 3-24, 26-42, 44-52, 54-55, 57-61, 63-92 of the co-pending application. That is, the claims 3-24, 26-42, 44-52, 54-55, 57-61, 63-92 of the co-pending application fall entirely within the scope of the instant claims 3-21, 23-24, 26-36, 38-39, 41-46, 48-49, 51-55. Thus the instant claims encompass the claims in the patent application and are related as genus and species, and are coextensive in scope.

The courts have stated that a genus is obvious in view of the teachings of a species. see Slayter, 276 F.2d 408, 411, 125 USPQ 345, 347 (CCPA 1960); and In re Gosteli, 872 F.2d 1008, 10 USPQ2d 1614 (Fed.Cir. 1989). Therefore the instantly claimed invention is obvious over the claims in the co-pending application.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to arguments:

7. With regard to the rejection of claims 38-39, under 35 USC 112, second paragraph, . Applicants' arguments and amendment are fully considered and the rejection is withdrawn herein in view of the amendment.

8. With regard to the rejection of claims 1-5, 7-24, 26, 28-36, 38-44, 46 under 35 USC 102(b) as being anticipated by Collins, Applicants' arguments are fully considered and found persuasive. The rejection is withdrawn herein in view of new grounds of rejection.

9. With regard to the rejections made in the previous office action under 35 USC 103(a), Applicants' arguments and amendment are fully considered and the arguments are found persuasive The rejection is withdrawn herein in view of new grounds of rejection..

10. With regard to the rejection of claims 1-24, 26-26, 38-46, 48-55 under provisional double patenting, Applicants' arguments are fully considered and the rejection is maintained until the issue under consideration is resolved.

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suryaprabha Chunduru whose telephone number is 571-272-0783. The examiner can normally be reached on 8.30A.M. - 4.30P.M , Mon - Friday,.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Prabha Chunduru
SURYAPRABHA CHUNDURU 5/30/06
PATENT EXAMINER

Suryaprabha Chunduru
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Art Unit 1637